

**60th Medical Group (AMC), Travis AFB, CA**  
**INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE (IACUC)**

**FINAL REPORT SUMMARY**

(Please type all information. Use additional pages if necessary.)

PROTOCOL #: FDG20140008A

DATE: 6 February 2015

PROTOCOL TITLE: A Pilot Study of Common Bile Duct Reconstruction with CorMatrix® Extracellular Matrix in Swine (*Sus scrofa*)

PRINCIPAL INVESTIGATOR (PI) / TRAINING COORDINATOR (TC): Lt Col Hight (Deployed)/Capt R. Russo

DEPARTMENT: General Surgery

PHONE #: (707)423-5224

INITIAL APPROVAL DATE: 19 December 2014

LAST TRIENNIAL REVISION DATE: N/A

FUNDING SOURCE: AF Surgeon General's Office

**1. RECORD OF ANIMAL USAGE:**

Animal Species:	Total # Approved	# Used this FY	Total # Used to Date
Swine ( <i>Sus scrofa</i> )	10	10	10

**2. PROTOCOL TYPE / CHARACTERISTICS:** (Check all applicable terms in EACH column)

<input type="checkbox"/> Training: Live Animal	<input type="checkbox"/> Medical Readiness	<input type="checkbox"/> Prolonged Restraint
<input type="checkbox"/> Training: non-Live Animal	<input type="checkbox"/> Health Promotion	<input type="checkbox"/> Multiple Survival Surgery
<input checked="" type="checkbox"/> Research: Survival (chronic)	<input type="checkbox"/> Prevention	<input type="checkbox"/> Behavioral Study
<input type="checkbox"/> Research: non-Survival (acute)	<input type="checkbox"/> Utilization Mgt.	<input type="checkbox"/> Adjuvant Use
<input type="checkbox"/> Other ( )	<input checked="" type="checkbox"/> Other (Treatment )	<input type="checkbox"/> Biohazard

**3. PROTOCOL PAIN CATEGORY (USDA):** (Check applicable) ☐ C ☒ D ☐ E

**4. PROTOCOL STATUS:**

**\*Request Protocol Closure:**

☐ Inactive, protocol never initiated

☐ Inactive, protocol initiated but has not/will not be completed

☒ Completed, all approved procedures/animal uses have been completed

**5. Previous Amendments:**

List all amendments made to the protocol. IF none occurred, state NONE. Do not use N/A.

**For the Entire Study Chronologically**

Amendment Number	Date of Approval	Summary of the Change
1	27 June 2014	Personnel Changes
2	16 July 2014	Personnel Changes
3	6 Aug 2014	Personnel Changes

6. **FUNDING STATUS:** Funding allocated: \$10500 Funds remaining: \$ 0

7. **PROTOCOL PERSONNEL CHANGES:**

Have there been any personnel/staffing changes (PI/CI/AI/TC/Instructor) since the last IACUC approval of protocol, or annual review? ☒ Yes ☐ No

If yes, complete the following sections (Additions/Deletions). For additions, indicate whether or not the IACUC has approved this addition.

**ADDITIONS:** (Include Name, Protocol function - PI/CI/AI/TC/Instructor, IACUC approval - Yes/No)

Maj Lucas Neff, AI/Surgeon, 27 June 2014

Capt Hilary Gallogly, AI/Assistant Surgeon, 16 July 2014

Capt Rachel Russo, AI/Surgeon, 06 August 2014

**DELETIONS:** (Include Name, Protocol function - PI/CI/AI/TC/Instructor, Effective date of deletion)

None

8. **PROBLEMS / ADVERSE EVENTS:** Identify any problems or adverse events that have affected study progress. Itemize adverse events that have led to unanticipated animal illness, distress, injury, or death; and indicate whether or not these events were reported to the IACUC.

Three pigs were euthanized after 1-2 days due to bowel obstruction or bile peritonitis. This was reported to the IACUC chair.

9. **REDUCTION, REFINEMENT, OR REPLACEMENT OF ANIMAL USE:**

**REPLACEMENT (ALTERNATIVES):** Since the last IACUC approval, have alternatives to animal use become available that could be substituted in this protocol without adversely affecting study or training objectives?

No.

**REFINEMENT:** Since the last IACUC approval, have any study refinements been implemented to reduce the degree of pain or distress experienced by study animals, or have animals of lower phylogenetic status or sentence been identified as potential study/training models in this protocol?

No.

**REDUCTION:** Since the last IACUC approval, have any methods been identified to reduce the number of live animals used in this protocol?

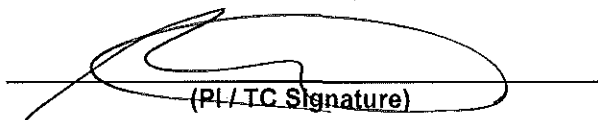
No.

10. **PUBLICATIONS / PRESENTATIONS:** (List any scientific publications and/or presentations that have resulted from this protocol. Include pending/scheduled publications or presentations).

None.

11. **Were the protocol objectives met, and how will the outcome or training benefit the DoD/USAF?**

We developed a porcine model of common bile duct injury and interposition grafting, gained experience managing these patients post operatively, and assessed the suitability of CorMatrix interposition grafts for repair of these injuries. The CorMatrix was not infiltrated by stem cells (Cholangiocytes) but did seem to be surrounded by Cholangiocytes. More studies will need to be conducted to determine if CorMatrix will clinically useful as an interposition graft or as a form of biologic stenting.

  
(PI/TC Signature)

13 July 2015  
(Date)

**Attachments:**

Attachment 1: Defense Technical Information Center (DTIC) Abstract Submission (Mandatory)

**Attachment 1  
Defense Technical Information Center (DTIC) Abstract Submission**

This abstract requires a brief (no more than 200 words) factual summary of the most significant information in the following format: Objectives, Methods, Results, and Conclusion.

**OBJECTIVES:** A new material made from pig intestine has been used to replace segments of blood vessels. We used this same material to replace common bile ducts (CBD) in pigs.

**METHODS:** A 1cm segment of CBD was removed from 10 anesthetized swine and replaced with a CorMatrix® interposition graft. Cholangiograms were performed one week after surgery to assess graft patency and anastomotic leaks. Swine were euthanized on post operative day 45 and histopathology was performed.

**RESULTS:** One of ten pigs was used for technique development. Among the remaining nine pigs, three were euthanized after 24 to 48 hours due to bile peritonitis or bowel obstruction. Six pigs survived to the conclusion of the study. Two of these developed gastric ulcers. The remaining four pigs did well during the post-operative period. Tissues from six pigs were examined histologically. The bile duct grafts showed little evidence of cellular infiltration. Two grafts were infected. All six pigs showed evidence of mild to moderate extrahepatic cholestasis.

**CONCLUSIONS:** The injury model developed in this experiment was prone to causing early bowel obstructions and gastric ulcers. The CorMatrix interposition graft provided continuity for bile drainage, but led to strictures, leaks, cholestasis, and cholangitis.

**Grant Number:** \_\_\_\_\_

**From:** \_\_\_\_\_

**\*\*If you utilized an external grant, please provide Grant # and where the grant came from. Thank you.**